Michigan Department of Community Health
MDCH
Jennifer M. Granholm, Governor
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LabLink

Michigan Department of Community Health
Bureau of Laboratories

"Quality Laboratory Science for Healthier People and Communities"

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Michigan Sentinel Influenza Network

Patty Clark, M.P.H.
Viral Serology/Viral Isolation/Viral Molecular Unit

Surveillance for influenza and other respiratory viruses is accomplished year-round by collection of data from a network of sources including the Michigan Department of Community Health (MDCH) laboratory, voluntary participation of sentinel physicians and sentinel laboratories across the state, the Michigan Disease Surveillance System (MDSS), the MDSS Syndromic Surveillance System, and Over-The-Counter (OTC) sales of nonprescription items.

The MDCH laboratory receives specimens for respiratory viral culture from various sources including the sentinel network physician offices, hospitals, local health departments and clinics. Viruses recovered from these specimens are typed and, in the case of influenza A, subtyped. A representative sample of influenza viruses isolated at the MDCH laboratory are sent to the Centers for Disease Control and Prevention (CDC) throughout the year for further viral characterization.

Sentinel laboratories are recruited annually to report via a weekly tally sheet the numbers of positive and total tests for influenza A and B (or untyped), parainfluenza, respiratory syncytial virus (RSV), and adenovirus. Tally sheets are updated and faxed to the MDCH Bureau of Epidemiology on a weekly basis. Sentinel labs are asked to provide influenza viral isolates or antigen-positive specimens for culture confirmation to the MDCH laboratory. Sentinel labs are encouraged to submit two or three isolates or specimens each from the beginning, middle and end of the influenza season and during the summer months. MDCH has enrolled 18 sentinel laboratories for the 2007-08 season.

Sentinel physicians are recruited to submit specimens to the MDCH lab for viral culture from clients with influenza-like illness (ILI). Sentinel physicians are asked to collect two or three samples early in the season when they begin to see more ILI cases than usual, three samples when the numbers of ILI cases are high, two or three samples as ILI cases become less frequent towards the end of the season, and two more samples during the summer months. Physicians are also encouraged to submit samples during the year from particularly severe or unusual cases. There are currently 95 physician offices enrolled as sentinel physicians in Michigan.

The MDSS has revolutionized communicable disease reporting in Michigan. It allows immediate communication among disease reporting institutions and healthcare

professionals, local health departments, and MDCH regarding investigations into possible cases of communicable disease. MDSS is a dynamic, continually active system. Counts of disease are constantly changing as cases are investigated, confirmed, or ruled out as not meeting a case definition. The MDSS Weekly Disease Report reflects the recent activity. Instant communications regarding potential and confirmed cases are provided to disease control personnel.

The MDSS Syndromic Surveillance System facilitates rapid detection and public health response to outbreaks of illness. This system works through real time detection of a notable increase in patients presenting for care with similar symptoms. The system has tools that include automatic data collection, automatic aberration detection algorithms and tools to support temporal and spatial data analysis and visualization. The Michigan Influenza Surveillance Network monitors the Syndromic Surveillance System for increased levels of respiratory or constitutional complaints as an indicator of increased ILI in the state.

Over-the-counter (OTC) sales for nonprescription drugs such as cold care products and items such as thermometers are monitored as additional indicators of increased ILI in the state. The OTC Surveillance System monitors these purchases in real time and is capable of separating purchases made as a result of an item being on-sale versus an item purchased at its regular price.

None of these indicators is used by itself to determine influenza activity but is used in conjunction with each other to form a judgment of the level of influenza activity throughout the state on a weekly basis. This determination is forwarded to CDC and published weekly in the MIFluFocus Report.

Further information on the Michigan Influenza Surveillance System can be found on-line at www.michigan.gov/flu ? Seasonal Influenza ? Michigan Influenza Surveillance.

Abrin: New Assay to the Chemistry-Toxicology Test Menu

Ninah Sasy, B.S.
Division of Chemistry and Toxicology

Abrin is a natural poison that is found in the seeds of a plant called the rosary pea or jequirity pea. It is similar to ricin, but more toxic. Abrin is a stable substance, meaning it can last for a long time in the environment despite extreme conditions such as very hot or very cold temperatures. It works by invading the cells of a person's body and preventing them from producing needed proteins. Without the proteins, cells die. Eventually this is harmful to the whole body, and death may occur.

The symptoms of abrin poisoning depend on the route of exposure and the dose received, though many organs may be affected in severe cases. Initial symptoms of abrin poisoning by inhalation may occur within eight (8) hours of exposure; respiratory distress, fever, cough, nausea, and tightness in the chest. Heavy sweating may follow as well as pulmonary edema. If abrin is ingested, initial symptoms may occur in less than six (6) hours but are usually delayed for one to three days. Swallowing a significant amount of abrin, would result in vomiting and diarrhea that may become bloody. Severe dehydration may develop, followed by a decrease in blood pressure. Other signs or symptoms may include hallucinations, seizures, and blood in the urine.

Abrin biomarkers are detected in urine using High Performance Liquid Chromatograph/ Tandem Mass Spectrometry. The optimal amount of urine for analysis is 25 mL. The minimal amount required for testing is 1.5 mL. Prior arrangments with MDCH and a chain-of-

custody form are required for testing. Because there are forensic requirements when collecting and packaging specimens from a patient potentially exposed in a chemical event, please contact boehmem@michigan.gov for specific information of training on specimen collection and packaging.

For more information about abrin and other chemical agents, visit http://www.bt.cdc.gov/agent/agentlistchem.asp.

Please visit www.michigan.gov/mdchlab > Chemistry & Toxicology> Chemical Terrorism Laboratory Preparedness for information about our Chemical Terrorism Laboratory Response Program.

Upcoming Exercise Laboratory Response in a Chemical Exposure (Terrorism) Event

Ninah Sasy, B.S.
Division of Chemistry and Toxicology

MDCH would like your participation! This spring the Bureau of Laboratories would like to conduct Chemical Exposure Packaging and Shipping Response Exercises with hospitals and local health department laboratories in Michigan. The exercises will test the capabilities of labs to submit five (5) sets of patient samples (blood and/or urine) to the MDCH laboratory for testing. If interested in participating, contact sasyn@michigan.gov. Why participate? **This exercise will help satisfy JCAHO exercise requirements!**

Has your facility received training regarding packaging and shipping specimens from potential chemically exposed victims? If not, MDCH continues to offer training for staff in the proper collection and handling of these specimens. This training, "Laboratory Response and Hospital Preparedness in a Chemical Exposure (Terrorism) Event," is conducted by Martha Boehme, Chemical Terrorism Laboratory Response Educator. It may be scheduled as a live session or as self-paced online training. To schedule an on-site session, call 517-335-9654. For online training, register at http://mi.train.org.

Laboratory Response and Hospital Preparedness in a Chemical Exposure Event is approved for 1 contact hour by the Michigan Nurses Association, an accredited approver of continuing nursing education by the American Nurses Credentialing Center Commission on Accreditation. The presenter and the planning team have no commercial interests or conflicts of interest to disclose. No commercial support has been received for this event.

Update

The chemical information source matrix has been updated. Visit http://www.michigan.gov/documents/mdch/ICTW_InfoMatrix_2008_read_only_221005_7.xls. Please print and add this updated version to the CT Information Manual located in your red CT kit.

Bureau of Laboratories Vision

The Bureau of Laboratories is a stronger, more diverse team within an integrated public health system. We utilize advanced technology and innovative leadership to provide comprehensive public health services in our dynamic global community.

Bureau of Laboratories Mission

We are dedicated to continuing leadership in providing quality laboratory science for healthier people and communities through partnerships, communication and technical innovation.

Staff Publications

Recent publications include:

1. Loconto, P.R., D. Isenga, M. O'Keefe, and M. Knottnerus, "Isolation and recovery of Selected Polybrominated Diphenyl Ethers from Human and Sheep Serum: Coupling Reversed-Phase Solid-Phase Disk Extraction and Liquid-Liquid Extraction Techniques with a Capillary Gas Chromatographic Electron Capture Negative Ion Mass Spectrometric Determinative Technique," *Journal of Chromatographic Science,* January, 2008.

2. Downes, F., 2007. Improving Infectious Disease Surveillance and Detection: Public Health Laboratory Perspective, *In* Global Infectious Disease Surveillance and Detection. Workshop Summary, Institute of Medicine of the National Academies, Washington, D.C.

Rabies Submission Totals For 2007

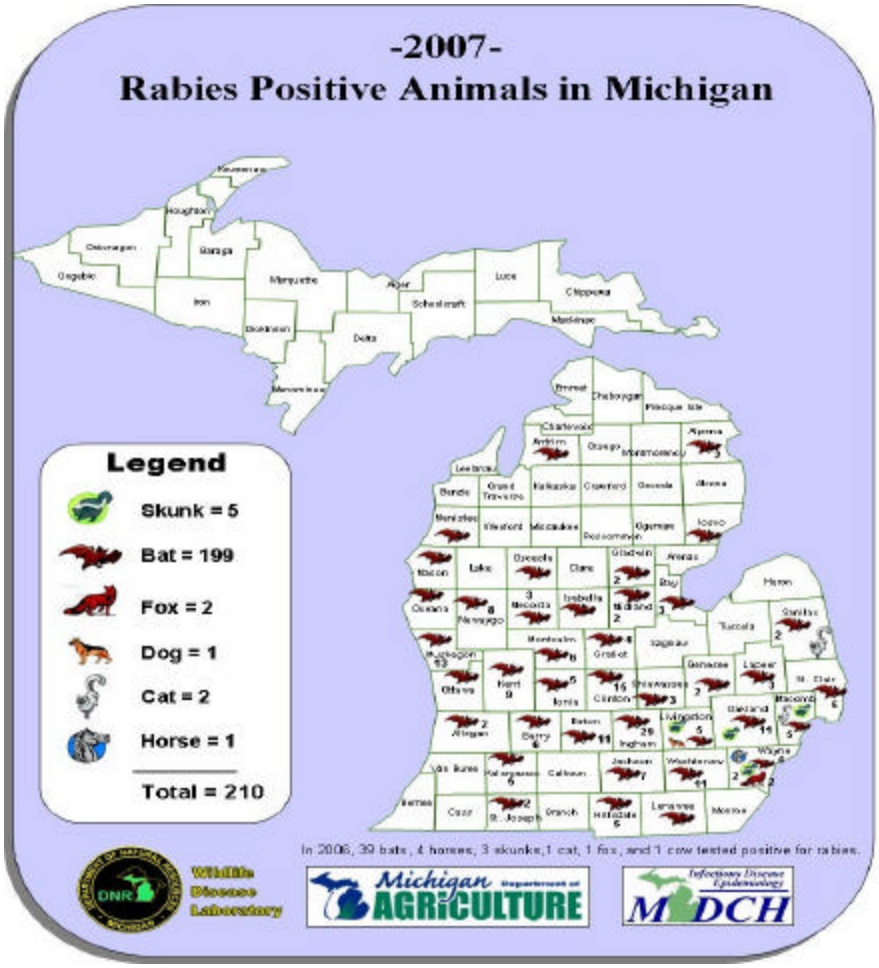
Patty Clark, M.P.H.
Viral Serology/Viral Isolation/Viral Molecular Unit

The MDCH Bureau of Laboratories received a record number of rabies submissions in 2007 with 3863 animal specimens submitted from various agencies throughout the state. This is the highest number of specimens received in any year since the lab began rabies-testing in 1954 and was a 29.6% increase over the next highest year for submissions (2001) when 2981 samples were received.

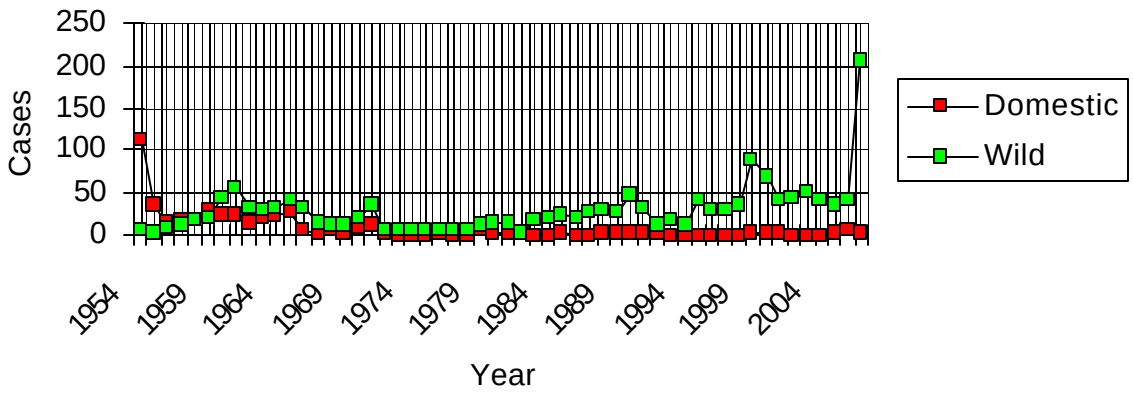
The number of rabies positives detected also set a new lab record. In 2007, a total, of 210 rabies positive animals were detected, including 5 skunks, 2 fox, 1 dog, 2 cats, 1 horse and 199 bats. As a comparison, in 2006, the lab detected 49 rabies positive animals (3 skunks, 1 fox, 1 cat, 4 horses, 1 cow and 39 bats). A breakdown of 2007 positive animals by county may be found on the accompanying map (page 5)

Typically, the annual positivity rate for rabies submissions is between 1% and 5%. In 2007, the positivity rate was 5.4%. The 2006 rabies positivity rate was 2.0% and in 2005, 1.65%. The year with the next highest positivity rate was 1999 with 3.4% (92/2705).

Any 2008 projections would only be speculative. However, in the first two weeks of 2008 the lab received 90 rabies specimens compared to 77 in the first two weeks of 2007. If this trend continues, it may be another record-breaking year.



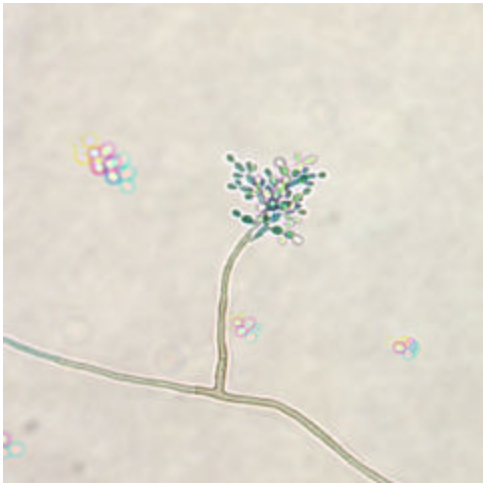
Cases of Animal Rabies, Michigan 1954 - 2007

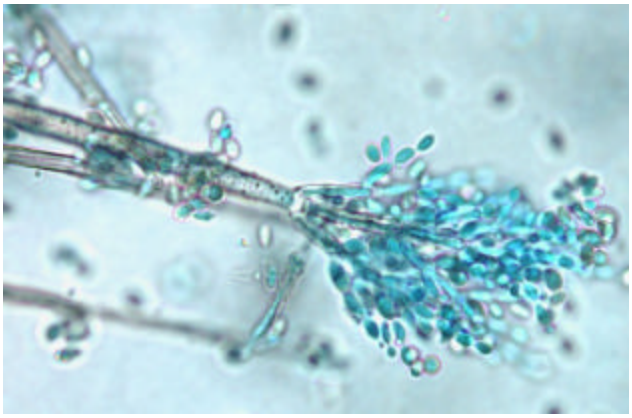


FUN FUNGI.....
Hormoconis resinae

Sandy Arduin MT(ASCP) & Bruce Palma MT(ASCP) - Mycobacteriology/Mycology Unit

Last Issues Picture Quiz Answer:





Hormoconis resinae

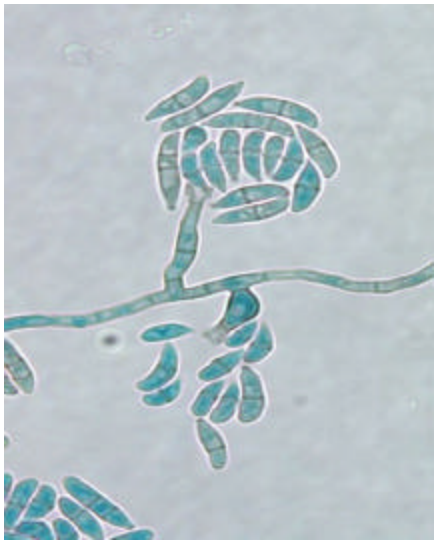
Hormoconis resinae, also known as *Cladosporium resinae*, is the anamorphic state of *Amorphotheca resinae*. It is commonly referred to as the kerosene, jet-fuel or creosote fungus. *H. resinae* has the ability to grow on several inhospitable substrates, including kerosene, aviation fuel, creosoted wood, coniferous resin and asphalt pavements. This fungus grows on water and can grow in jet fuel contaminated with small amounts of water. The mycelium clogs fuel lines and the waste products of the fungus cause corrosion of metal fuel tanks.

The isolate received at MDCH was from a bronchial specimen. The colony was originally grey-white and velvety. On subculture the colony was light brown and powdery with a dark brown reverse. Microscopically, the conidiophores were stout, brown, roughened and branched by means of ramnoconidia. Conidia were hyaline to light brown, ellipsoidal and formed in chains.

References:

1. Wang, D.J.K., Zabel, R.A., 1990. *Identification Manual for Fungi from Utility Poles in the Eastern United States.* Allen Press. Lawrence, KS.
2. Seifert, K.A., Hughes, S.J., Boulay, H., Louise-Seize, G., 2007. *Taxonomy, Nomenclature and Phylogeny of Three Cladosporium-like Hyphomycetes, Sorocybe resinae, Seifertia azaleae and the Hormoconis anamorph of Amorphotheca resinae*, *in* Studies in Mycology 58:235-245.
3. *Attack of the Fungi,* Flight Safety Australia, September-October 2005.
4. *Amorphotheca resinae*, https://fungalgenomics.concordia.ca/fungi/Ares.php

This Issues Picture Quiz: What Mould is this?



Collaborative Effort to More Effectively Quantitate PBDEs from Human Serum

Paul R. Loconto, Ph.D.
Analytical Chemistry Section

The importance of isolating and recovering the flame retardant chemicals, polybrominated diphenyl ethers (PBDEs), from biological samples was introduced in a previous *LabLink* article (1). Analytical method development carried out for over two years in the Analytical Chemistry Section of the Division of Chemistry and Toxicology has provided state epidemiologists and university scientists much needed quantitative results for PBDEs in biological specimens. Quantitative analysis for PBDEs at ultra-low concentration levels in human serum and human breast milk greatly assists researchers as they seek to understand causes of chronic illness such as ADHD in children and endocrine disruption in adults. A comparison study of liquid-liquid extraction/column chromatographic cleanup versus reversed-phase solid-phase disk extraction completed at the MDCH laboratory was recently published (2).

Early in 2007, Gerstel GmbH, an innovative manufacturer of automated sample preparation technology, offered to extend previous method development work involving PBDEs at no additional cost to the MDCH laboratory. Gerstel technology is already present in the laboratory, as required by the CDC's LRN-C program for Level-1 and Level-2 state public health laboratories. By installing the Twister® technology to one of the existing gas chromatograph-mass spectrometers, it is hoped that the previous methodology could be incorporated with the automation and ease of sample preparation afforded by the Twister modification. Gerstel wanted MDCH to assess technical feasibility.

Twister is Gerstel's trade name for stir-bar sorptive extraction (SBSE). SBSE is a miniaturized form of reversed-phase solid-phase extraction. Gerstel provided formalized instruction, at no cost to the State, at the training facility associated with Rockford College, Rockford, IL. Analytical method development utilizing this SBSE technique in water and in sheep serum (as of this writing) has begun. The long-term benefit for MDCH is a significant reduction in time and labor as a "greener" approach to sample preparation since SBSE is "solventless" and easily automated.

References Cited:

1. Loconto, P.R. "Michigan's Newest Brominated Threat," *LabLink*, (quarterly newsletter for the MDCH Bureau of Laboratories) 11(4), 2006.

2. Loconto, P.R., D. Isenga, M. O'Keefe, and M. Knottnerus, "Isolation and recovery of Selected Polybrominated Diphenyl Ethers from Human and Sheep Serum: Coupling Reversed-Phase Solid-Phase Disk Extraction and Liquid-Liquid Extraction Techniques with a Capillary Gas Chromatographic Electron Capture Negative Ion Mass Spectrometric Determinative Technique," *Journal of Chromatographic Science,* January, 2008.

LabLink is published quarterly by the Michigan Department of Community Health, Bureau of Laboratories, to provide laboratory information to Michigan health professionals and the public health community.

Director, Bureau of Laboratories Frances Pouch Downes, Dr.P.H.

Editor Susan L. Shiflett

Laboratory Biosafety Plan Recommendations

Frances Pouch Downes, Dr. P.H.
Laboratory Director

Widespread lapses in laboratory biosafety practices were revealed during an investigation of laboratories participating in a College of American Pathologists Laboratory Preparedness Survey (LPS) proficiency testing challenge in November 2007. All laboratories working with infectious organisms and/or human specimens need to have and adhere to a biosafety plan based on recommended practices.

The initial report of the investigation (MMWR 57(02)36-9) identified laboratory biosafety improvement needs. Preliminary data from the Michigan investigation indicated that of the 54 Michigan labs that participated, 24 reported potential occupation exposures within the laboratory. High risk exposures were reported for 87 employees and low risk exposures for 32 employees. High and low risk exposures are defined in the MMWR report. Of the 87 employees with potential high risk exposures, 70 reported that they had accepted antibiotic post-exposure prophylaxis.

Even microbiology laboratories that do not subscribe to the LPS or offer testing for biosafety level 3 organisms, may receive and test specimens that contain microorganisms that if handled inappropriately can pose a risk to laboratory workers. Any spinal fluid could contain *Neisseria meningitidis*. Any blood culture could contain pathogenic strains of *Brucella* sp. The adoption of universal precautions in the 1980's was successful in addressing occupational exposure to blood borne pathogens. A similar universal approach is needed to safely handling specimens and cultures that could contain microorganisms that have a history of causing laboratory worker occupational illness.

Laboratories processing human specimens and performing culture need a biosafety plan that addresses the following:

- Class II biosafety cabinet (BSC) should be available in all microbiology laboratories: properly installed and maintained, certified annually.
- Procedures should be reviewed to eliminate or minimize aerosol-generating processes. Do not sniff plates.
- High risk culture plates and isolates should be handled in a Class II BSC until Gram stain results rule out tiny gram negative coccobacillus and gram negative diplococci.
- Occupational vaccination and medical surveillance should be provided and based on a risk assessment of the individual's assigned duties.
- Training in infection prevention should be integrated into employee orientation and revisited regularly.

Detection of Shiga Toxin-Producing E. coli in Clinical Specimens

Patricia A. Somsel, Dr.P.H
James T. Rudrik, Ph.D.
John Dyke, Ph.D.

There has been much discussion on the American Society for Microbiology Div C List Serve of an appropriate algorithm for detection of Shiga toxin-producing *E.coli* (STEC) in clinical specimens. CDC published guidelines last year (MMWR 2006;55:1042-1045) on the importance of culture confirmation of positive Shiga toxin tests. Rapid non-culture-based results may provide information to the medical care provider to better direct therapy, as evidence suggests Shiga toxin type 2 (Stx2) is more likely associated with HUS than Shiga toxin type 1 (Stx1). Preliminary rapid results are crucial since early intervention with aggressive fluid support may be more likely to produce a favorable outcome. Confirmation of

these results is essential to assure accuracy of non-culture test results and to assure the outbreak investigations that follow are effective.

A positive toxin test is not definitive for the presence of STEC because of interference from other organisms (MMWR 2001;50:489-91) and because of the ability of other organisms to produce the toxin (e.g., *Shigella dysenteriae* type 1). Recovery of sorbitol negative colonies, which type as O157, does not confirm the ability of the organism to produce Shiga toxin. Therefore, diagnostic algorithms need to take a two-pronged approach:

1. To assure rapid implementation of appropriate treatment of patients, these *preliminary* results (e.g., positive toxin tests, or recovery of sorbitol-negative O157 isolates on culture) should be reported expeditiously to physicians.
2. To assure appropriate public health response, *preliminary* results should be promptly reported (as required by state law) to public health officials. All possible or confirmed *E.coli* O157:H7 isolates and/or the broth from the positive toxin test should be forwarded to a public health laboratory for confirmation, serotyping and molecular characterization. This additional information is needed to detect clusters of disease, to identify contaminated foods and remove them from the market place, and to identify production practices that put the food supply chain at risk.

Due to documented problems with false-positive results from toxin-detection test kits, MDCH considers results from these tools to be preliminary, and requests that the stool in transport and the broth subculture (or isolates from SMAC culture) be submitted to the laboratory for confirmation. It is essential to explicitly follow the package insert with regard to specimen selection and processing because false positive results may mislead the physician and delay or deter appropriate therapy for the index patient. Additionally, false positives can result in an expensive and inappropriate investigation by local, state and national public health officials. Both positive and negative results should be considered in the context of the patient's presentation. When test results consistently fail to be supported by clinical findings and public health investigation, an evaluation of the test system should be considered. As part of a comprehensive quality assurance plan, clinical laboratories should compare their Stx EIA (or PCR) results with confirmatory testing obtained by their public health laboratories (or other reference laboratory) and investigate any discrepancies. As clinical laboratories move away from traditional culture-based testing to toxin and antigen testing, it is essential to perform a verification study to assure the test performs as expected when implemented in the laboratory. Per CLIA guidelines, if a laboratory chooses to depart from the package insert in any way, a full validation of the procedure as performed must be completed.

CDC recommends that diagnostic laboratories attempt to detect Shiga toxin-producing *E. coli* (STEC) from all stools submitted for routine enteric culture (i.e., along with *Salmonella, Shigella* and *Campylobacter*). The ideal approach to ensure detection and rapid characterization of all STEC would be to include media to detect STEC O157 and simultaneously screen for non-O157 STEC using an EIA (or PCR). It is recognized this approach may not be easily implemented in all clinical laboratories. MDCH is interested in assisting clinical colleagues in any way possible to find a solution that provides the best care for patients and addresses the challenges involved in this testing, including providing validation panels for toxin tests. Please contact Dr James Rudrik, 517-335-9641, rudrikj@michigan.gov with any questions.

MICHIGAN DEPARTMENT OF COMMUNITY HEALTH
BUREAU OF LABORATORIES
CENTENNIAL SYMPOSIUM
APRIL 21, 2008

In 1907, the Michigan legislature funded one bacteriologist and a budget of $3,665. Since that time, the Michigan Department of Community Health Bureau of Laboratories has been a pioneer of the science of public health.

To commemorate 100 years of quality laboratory services to the people of the State of Michigan, The Michigan Department of Community Health Bureau of Laboratories is sponsoring *"The Evolution of Public Health Laboratories"* symposium. The event will be held on Monday April 21, 2008 at the Kellogg Hotel and Conference Center in East Lansing, Michigan. Nationally and internationally recognized public health experts will discuss a variety of exciting topics.

Distinguished and invited guests to this event will include public health specialists and academics, health care providers and students of medicine, nursing, and laboratory sciences.

An evening panel discussion titled "*Meeting Future Challenges Facing Public Health: Multiple Perspectives*" begins at 7 PM at the Kellogg Conference Center in East Lansing and is open to the public. Panel participants include:

-Bobby Pestronk, M.P.H., Health Officer of the Genesee County Health Department and President of the National Association of County and City Health Officials.

-Janet Olszewski, MSW, Director of the Michigan Department of Community Health; Secretary-Treasurer of the Association of State and Territorial Health Officials.

-Frances P. Downes, Dr. P.H., Director of the Bureau of Laboratories and President of the Association of Public Health Laboratories

-Kenneth Warner, Ph.D. Dean of the University of Michigan School of Public Health.

-Dean of the College of Medicine, Michigan State University. (*Invited*)

-Ronald M. Davis, M.D, Director of the Center for Health Promotion and Disease Prevention Henry Ford Health Systems and President of the American Medical Association (*invited*)

Panel Moderator: Gretchen Millich, Journalist, WKAR Public Radio

Congratulations to the Bureau of Laboratories for 100 years of quality public health laboratory service!